WE CLAIM:

1. A method of making a solid electrolyte comprising the step of treating a porous membrane having a thickness of at most one mil with ionomer so that the membrane is fully impregnated with ionomer in the membrane's cross section.

2. A method according to claim 1, wherein the porous membrane is a porous polymeric membrane.

3. A method according to claim 1, wherein the porous membrane is expanded polytetrafluoroethylene.

4. A method according to claim 1, wherein the porous membrane has a porosity of greater than 35%.

5. A method according to claim 1, wherein the porous membrane has a porosity of 70% to 95%.

6. A method according to claim 1, wherein the thickness of the membrane is 0.06 mils to 0.8 mils.

7. A method according to claim 1, wherein the impregnated membrane is heated at 60°C to 200°C.

8. A method according to claim 1, wherein the impregnated membrane is heated at 120°C to 160°C.

9. A method according to claim 1, wherein the impregnation is achieved by two to eight treatments of ionomer.

10. A method according to claim 1, wherein the impregnation is achieved by treating both sides of the membrane.

11. A method according to claim 1, wherein the thickness of the solid electrolyte is approximately the same as the thickness of the porous membrane.

12. A method according to claim 1, wherein the ionomer is perfluorinated sulfonic acid resin.

13. A method according to claim 1, wherein the porous membrane is a porous polymeric membrane, wherein the porous membrane has a porosity of greater than 35%, and wherein the thickness of the membrane is 0.06 mils to 0.8 mils.

14. A method according to claim 1, wherein the porous membrane is expanded polytetrafluoroethylene, wherein the ionomer is perfluorinated sulfonic acid resin, wherein the porous membrane has a porosity of 70% to 95%, wherein the impregnated membrane is heated at

a temperature between 60°C and 200°C, and wherein the impregnation is achieved by treating both sides of the membrane.

15. A method of making a solid electrolyte consisting essentially of the step of treating a porous base material having a thickness of at most one mil with a solution of ion exchange resin so that the base material is fully impregnated with ion exchange resin in the base material's cross section, wherein the treating consists essentially of two or more impregnation and drying steps.

16. A method according to claim 15, wherein the porous base material is a polymeric membrane.

17. A method according to claim 15, wherein the porous base material is expanded polytetrafluoroethylene.

18. A method according to claim 15, wherein the porous base material has a porosity of greater than 35%.

19. A method according to claim 15, wherein the porous base material has a porosity of 70% to 95%.

20. A method according to claim 15, wherein the porous base material has a thickness of 0.06 mils to 0.8 mils.

21. A method according to claim 15, wherein the impregnated base material is heated at a temperature of 60°C to 200°C.

22. A method according to claim 15, wherein the ion exchange resin is perfluorinated sulfonic acid resin.

23. A method according to claim 15, wherein the porous base material is expanded polytetrafluoroethylene, wherein the ion exchange resin is perfluorinated sulfonic acid resin, wherein the porous base material has a porosity greater than 35%, wherein the porous base material has a thickness of 0.06 mils to 0.8 mils, and wherein the impregnated base material is heated at a temperature of 60°C to 200°C.

24. A method according to claim 15, wherein the porous base material is expanded polytetrafluoroethylene, wherein the ion exchange resin is perfluorinated sulfonic acid resin, wherein the porous base material has a porosity of 70% to 95%, wherein the porous base material has a thickness of 0.06 mils to 0.8 mils, and wherein the impregnated base is heated at a temperature of 120°C to 160°C

25. A method of preparing a substantially air occlusive integral composite membrane comprising:

(a) providing a polymeric support having a microstructure of micropores having a thickness of at most one mil;

(b) applying ion exchange resin solution to each major surface of said polymeric support;

whereby said micropores are sufficiently filled with ion exchange resin to form an air occlusive integral composite membrane which has an ionic conductance rate of at least 5.1 μmhos/min.

26. The method of claim 25, wherein said step (b) includes at least two successive applications of said ion exchange resin solution.

27. The method of claim 25, wherein said step (b) includes at least two successive applications of said ion exchange resin solution, each followed by a drying step.

28. The method of claim 25, wherein said step (b) includes at least three successive applications of said ion exchange resin solution, each followed by a drying step.

29. The method of claim 25, wherein said providing step (a) comprises providing as said polymeric support a polyolefin support.

30. The method of claim 25, wherein said providing step (a) comprises providing as said polymeric support a fluorinated polymer support.

31. The method of claim 25, wherein said providing step (a) comprises providing as said polymeric support a chlorinated polymer support.

32. The method of claim 25, wherein said support is expanded polytetrafluoroethylene.

33. The method of claim 25, wherein said ion exchange resin is perfluorinated sulfonic acid resin.

34. The method of claim 25, wherein said support is expanded polytetrafluoroethylene, wherein said ion exchange resin is perfluorinated sulfonic acid resin, and wherein said step (b) includes at least two successive applications of said ion exchange resin solution, each followed by a drying step.